

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

MO et al.

Application No.: Not Yet Assigned

Filed: Herewith

For: FIELD EFFECT TRANSISTOR  
AND METHOD OF ITS  
MANUFACTOR

Examiner: Not Yet Assigned

Art Unit: Not Yet Assigned

INFORMATION DISCLOSURE  
STATEMENT UNDER 37 CFR §1.97 and  
§1.98

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The references cited on attached form PTO/SB/08A and PTO/SB/08B are being called to the attention of the Examiner. In accordance with 37 CFR §1.98(d), copies of the references can be found in Application No. 08/970,221, filed November 14, 1997 (Attorney Docket No. 018865-001700US) and Application No. 09/854,102, filed May 9, 2001 (Attorney Docket No. 018865-001710US). It is respectfully requested that the cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement.

However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 20-1430. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Babak S. Sani', with a large, stylized loop at the end.

Babak S. Sani  
Reg. No. 37,495

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Attorney Docket Number	018865-001740US

**U.S. PATENT DOCUMENTS**

Examiner	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number Kind Code <sup>2</sup> (if known)			
	AA	4,070,690	01-24-1978	Wickstrom	
	AB	4,132,998	01-02-1979	Dingwall	
	AC	4,145,703	03-20-1979	Blanchard et al.	
	AD	4,326,332	04-27-1982	Kenney	
	AE	4,329,705	05-11-1982	Baker	
	AF	4,344,081	08-10-1982	Pao et al.	
	AG	4,345,265	08-17-1982	Blanchard	
	AH	4,398,339	08-16-1983	Blanchard et al.	
	AI	4,503,449	03-05-1985	David et al.	
	AJ	4,503,598	03-12-1985	Vora et al.	
	AK	4,541,001	09-10-1985	Schutten et al.	
	AL	4,639,762	01-27-1987	Neilson et al.	
	AM	4,682,405	07-28-1987	Blanchard et al.	
	AN	4,683,643	08-04-1987	Nakajima et al.	
	AO	4,767,722	08-30-1988	Blanchard	
	AP	4,808,543	02-28-1989	Parrillo et al.	
	AQ	4,845,537	07-04-1989	Nishimura et al.	
	AR	4,860,072	08-22-1989	Zommer	
	AS	4,881,105	11-14-1989	Davari et al.	
	AT	4,893,160	01-09-1990	Blanchard	
	AU	4,914,058	04-03-1990	Blanchard	
	AV	4,967,245	10-30-1990	Cogan et al.	
	AW	4,983,535	01-08-1991	Blanchard	
	AX	5,016,068	05-14-1991	Mori	
	AY	5,017,504	05-21-1991	Nishimura et al.	
	AZ	5,045,900	09-03-1991	Tamagawa	
	BA	5,072,266	12-10-1991	Buluzea et al.	
	BB	5,124,764	06-23-1992	Mori	
	BC	5,160,491	11-03-1992	Mori	
	BD	5,168,331	12-01-1992	Yilmaz	
	BE	5,298,442	03-29-1994	Buluzea et al.	
	BF	5,298,780	03-29-1994	Harada	
	BG	5,316,959	05-31-1994	Kwan et al.	
	BH	5,321,289	06-14-1994	Baba, et al.	

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		Number Kind Code <sup>2</sup> (if known)			
	BI	5,341,011	08-23-1994	Hshieh et al.	
	BJ	5,405,794	04-11-1995	Kim	
	BK	5,410,170	04-25-1995	Buluzea et al.	
	BL	5,430,324	07-04-1995	Bencuya	
	BM	5,455,190	10-03-1995	Hsu	
	BN	5,460,985	10-24-1995	Tokura, et al.	
	BO	5,468,982	11-21-1995	Hshieh et al.	
	BP	5,474,943	12-12-1995	Hshieh et al.	
	BQ	5,508,534	04-16-1996	Nakamura et al.	
	BR	5,532,179	07-02-1996	Chang et al.	
	BS	5,541,425	07-30-1996	Nishihara	
	BT	5,558,313	09-24-1996	Hshieh et al.	
	BU	5,567,634	10-22-1996	Hébert et al.	
	BV	5,578,851	11-26-1996	Hshieh et al.	
	BW	5,592,005	01-07-1997	Floyd et al.	
	BX	5,597,765	01-28-1997	Yilmaz et al.	
	BY	5,602,046	02-11-1997	Calafut et al.	
	BZ	5,605,852	02-25-1997	Bencuya	
	CA	5,614,751	03/25/1997	Yilmaz et al.	
	CB	5,629,543	05-13-1997	Hshieh et al.	
	CC	5,639,676	06-17-1997	Hshieh et al.	
	CD	5,648,670	07-15-1997	Blanchard	
	CE	5,661,322	08-26-1997	Williams et al.	
	CF	5,665,619	09-09-1997	Kwan et al.	
	CG	5,665,996	09-09-1997	Williams et al.	
	CH	5,674,766	10-07-1997	Darwish et al.	
	CI	5,688,725	11-18-1997	Darwish et al.	
	CJ	5,689,128	11-18-1997	Hshieh et al.	
	CK	5,701,026	12-23-1997	Fujishima et al.	
	CL	5,763,915	06-09-1998	Hsieh, et al.	
	CM	5,767,550	06-16-1998	Calafut et al.	
	CN	5,776,812	07-07-1998	Takahashi, et al.	
	CO	5,780,324	07-14-1998	Tokura, et al.	
	CP	5,783,491	07-21-1998	Nakamura et al.	

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	CQ	5,801,408	09-01-1998	Takahashi	
	CR	5,814,858	09-29-1998	Williams	
	CS	5,879,971	03-09-1999	Witek	
	CT	5,895,952	04-20-1999	Darwish et al.	
	CU	5,930,630	07-27-1999	Hsieh, et al.	
	CV	5,986,304	11-16-1999	Hsieh, et al.	
	CW	5,998,836	12-07-1999	Williams	
	CX	5,998,837	12-07-1999	Williams	
	CY	6,015,737	0118-2000	Tokura, et al.	
	CZ	6,049,108	04-11-2000	Williams et al.	
	DA	6,204,533 B1	03-20-2001	Williams et al.	

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)				
	DB	CN	1090680	A	04-27-1994			
	DC	EP	0 238 749	A2	09-30-1987			<input type="checkbox"/>
	DD	EP	0 550 770	B1	07-14-1993			<input type="checkbox"/>
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	DR	JP	58210678	A	12-07-1983			<input type="checkbox"/>

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		Country Code <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)				
	DS	JP	59080970	A	05-10-1984			<input type="checkbox"/>
	DT	JP	59193064	A	11-01-1984			<input type="checkbox"/>
	DU	JP	60028271	A	02-13-1985			<input type="checkbox"/>
	DV	JP	61102782	A	05-21-1986			<input type="checkbox"/>
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	DZ	JP	62046569	A	02-28-1987			<input type="checkbox"/>
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	EE	JP	08316479	A	11-29-1996			<input type="checkbox"/>
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	EG	JP	09102607	A	04-15-1997			<input type="checkbox"/>
	EH	JP	09270512	A	10-14-1997			<input type="checkbox"/>
	EI	WO	93/03502	A1	02-18-1993			<input type="checkbox"/>
	EJ	WO	95/34094	A1	12-14-1995			<input type="checkbox"/>
	EK	WO	97/07547	A1	02-27-1997			<input type="checkbox"/>
	EL	WO	97/16853	A1	05-09-1997			<input type="checkbox"/>

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NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	EM	BLANCHARD, R.A., "Optimization of discrete high power MOS transistors," <i>Stanford Electronics Laboratory, Integrated Circuits Laboratory</i> , April 1982, Technical Report No. IDEZ696-2.	
	EN	CHANG, T.S. AND CRITCHLOW, D.L., "Verticle FET random-access memories with deep trench isolation," <i>IBM Technical Disclosure Bulletin</i> , January 1980, pp. 3683-3687, Vol. 22(8B).	
	EO	GRANT, D.A. AND GOWER, J., "The development of power MOS devices," Chapter 1.2 <i>In Power Mosfets: Theory and applications</i> . John Wiley & Sons; New York, 1989, pp. 5-23.	
	EP	GOODENOUGH, F., "Dense MOSFET enables portable power control," <i>Electronic Design</i> April 14, 1997, pp. 45-50.	
	EQ	HOLMES, F.E., AND SALAMA, C.A.T., "V groove M.O.S. transistor technology," <i>Electronic Letters</i> , September 20, 1973, pp. 457-458, Vol. 9(19).	
	ER	LIDOW, A. et al., "Power Mosfet technology," <i>IEEE Technical Digest-Int. Electron Devices Meet.</i> 1979, pp. 79-83.	
	ES	LISIAK, K.P. and BERGER, J., "Optimization of nonplanar power MOS transistors," <i>IEEE Transactions on Electron Devices</i> , October 1978, pp. 1229-1234, Vol. Ed-25(10).	
	ET	OU-YANG, P., "Double ion implanted V-MOS technology," <i>IEEE Journal of Solid-State Circuits</i> , February 1977, pp. 3-10, Vol SC-12(1).	
	EU	SALAMA, C.A. AND OAKES, J.G., "Nonplanar power field-effect transistors," <i>IEEE Transactions on Electron Devices</i> , October 1978, pp. 1222-1228, Vol. Ed-25(10).	
	EV	SUN, S.C., "Physics and technology of power MOSFETs," <i>Stanford Electronics Laboratory, Integrated Circuits Laboratory</i> , February 1982, Technical Report No. IDEZ696-1.	
	EW	SZE, S.M., "P-N- Junction diode," Chapter 2 <i>In Physics of Semiconductor Devices</i> . Second Edition, John Wiley & Sons; New York, 1981, pp. 63-108.	

Examiner Signature	Date Considered
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